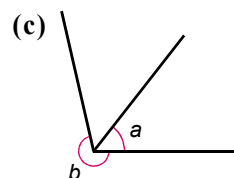
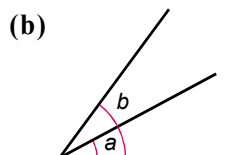
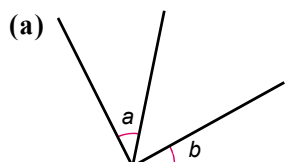


Build - up Exercise 13A

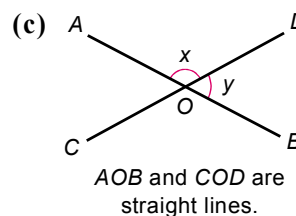
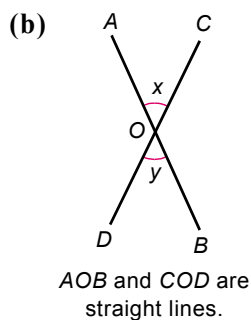
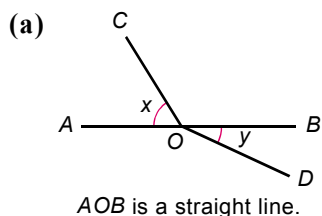


Fundamental Question

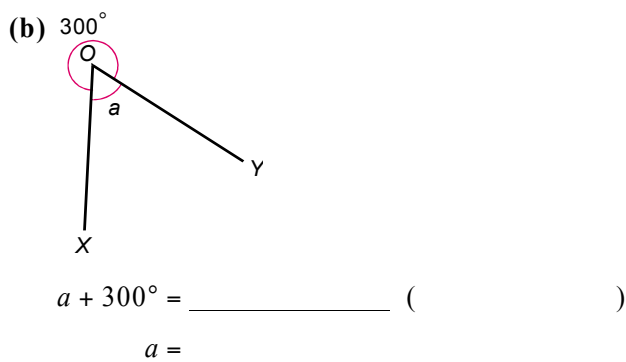
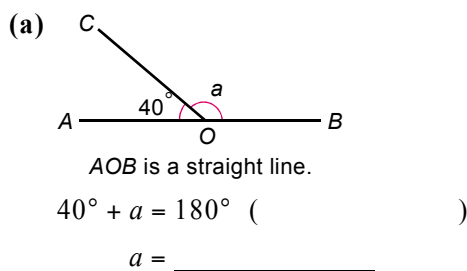
1. In each of the following figures, are a and b adjacent angles?

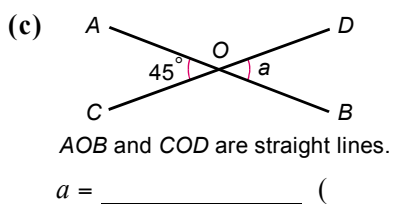


2. In each of the following figures, are x and y vertically opposite angles?



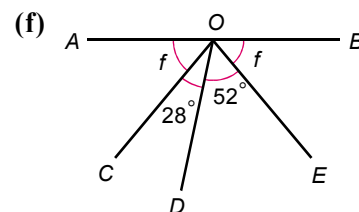
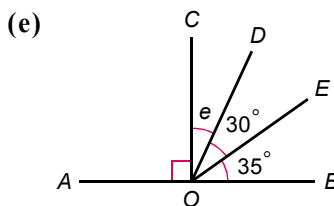
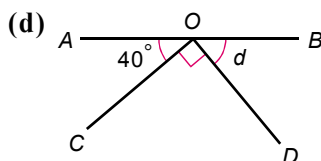
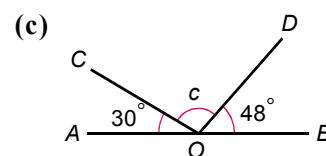
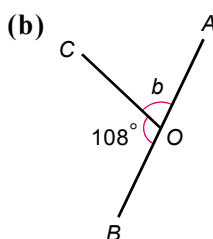
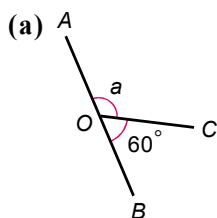
3. Fill in the blanks.



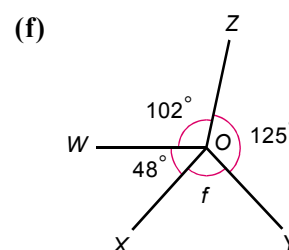
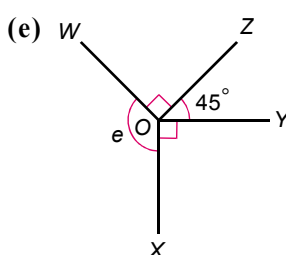
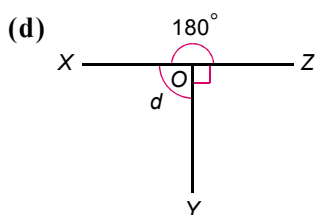
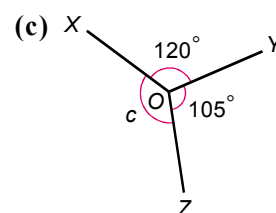
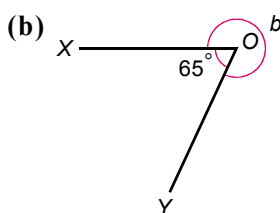
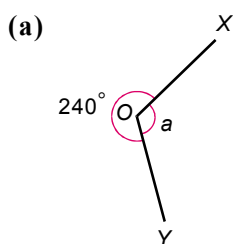


Consolidation Question

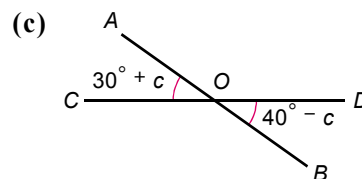
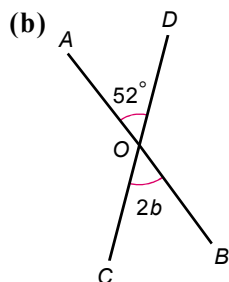
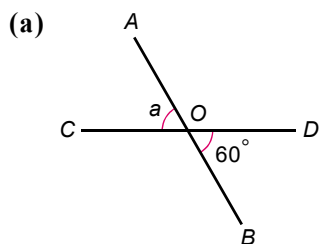
4. In each of the following figures, AOB is a straight line. Find the unknowns.



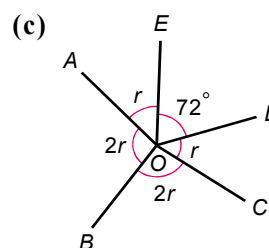
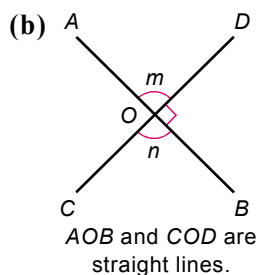
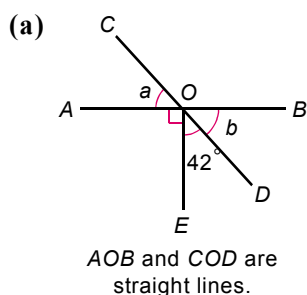
5. Find the unknowns in the following figures.



6. In each of the following figures, AOB and COD are straight lines. Find the unknowns.

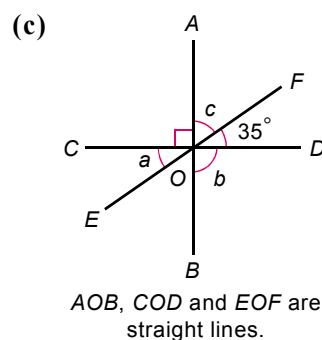
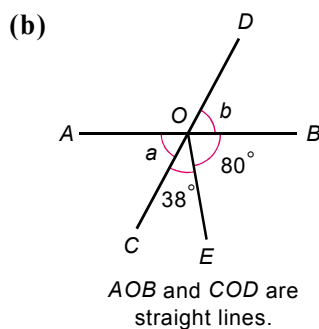
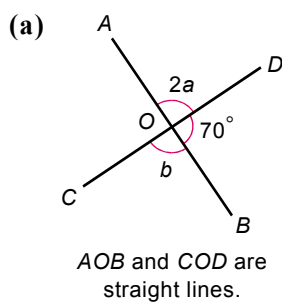


7. Find the unknowns in the following figures.

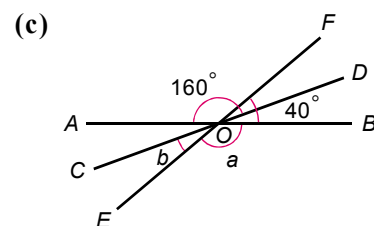
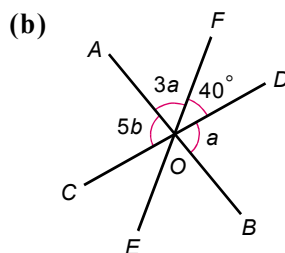
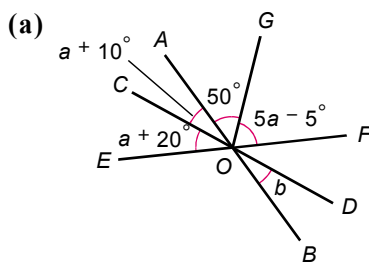


Challenging Question

8. Find the unknowns in the following figures.



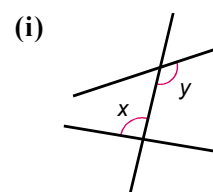
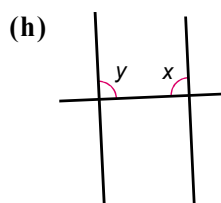
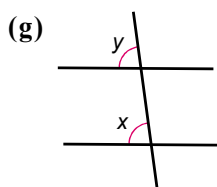
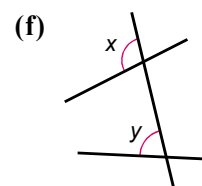
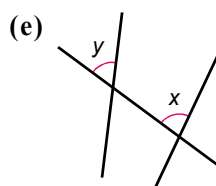
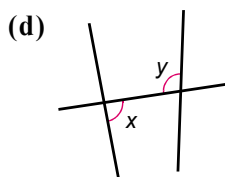
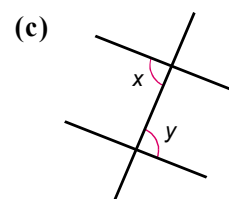
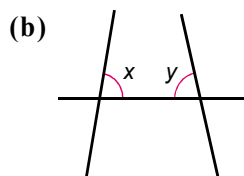
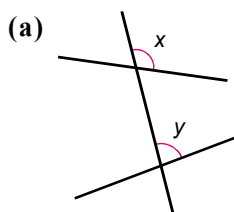
9. In each of the following figures, AOB , COD and EOF are straight lines. Find the unknowns.



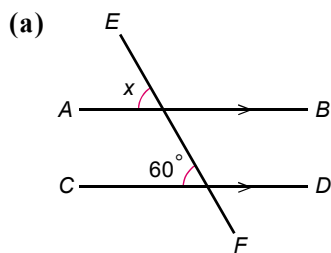
Build - up Exercise 13B

Fundamental Question

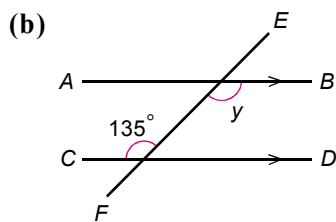
10. In each of the following figures, are x and y a pair of corresponding angles, alternate angles or interior angles on the same side?



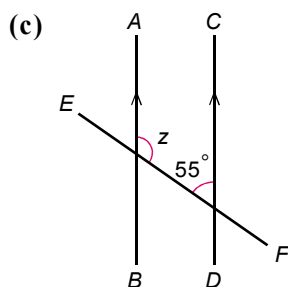
11. In each of the following figures, $AB \parallel CD$, EF is their transversal. Fill in the blanks.



$$x = \underline{\hspace{2cm}} \quad (\hspace{1cm})$$



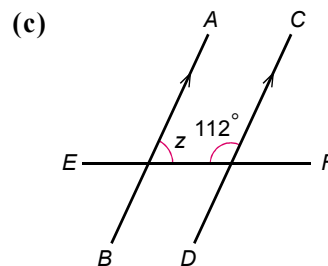
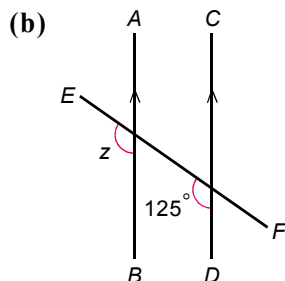
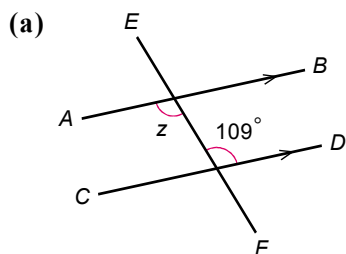
$$y = \underline{\hspace{2cm}} \quad (\hspace{1cm})$$

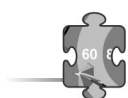


$$z + 55^\circ = \underline{\hspace{2cm}} \quad (\hspace{1cm})$$

$$z = \underline{\hspace{2cm}}$$

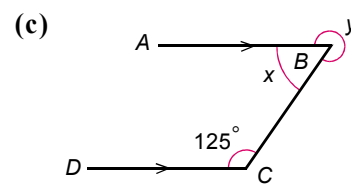
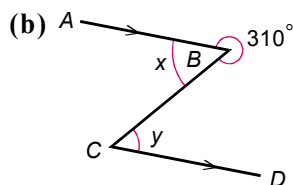
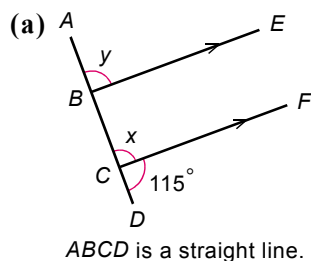
12. In each of the following figures, $AB \parallel CD$, EF is their transversal. Find the unknowns.



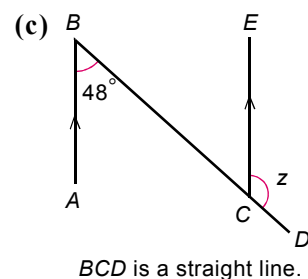
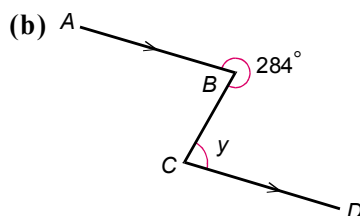
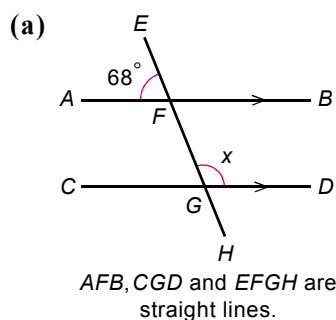


Consolidation Question

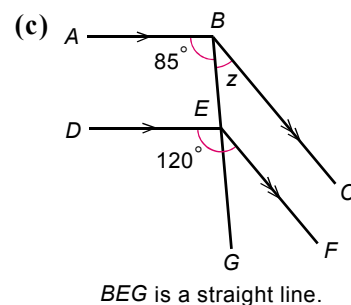
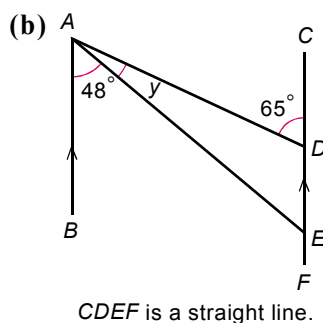
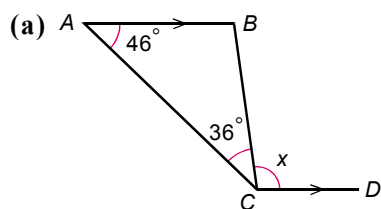
13. Find the unknowns in the following figures.



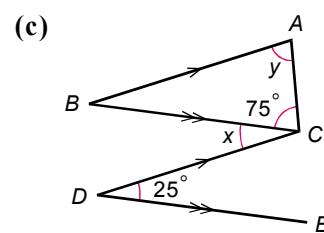
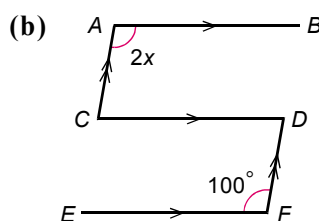
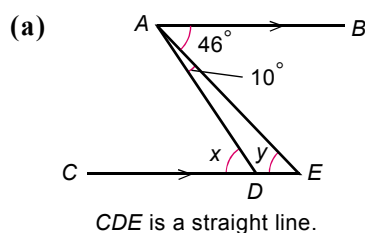
14. Find the unknowns in the following figures.



15. Find the unknowns in the following figures.



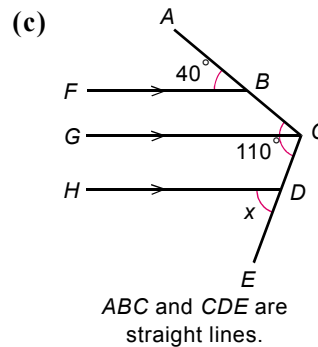
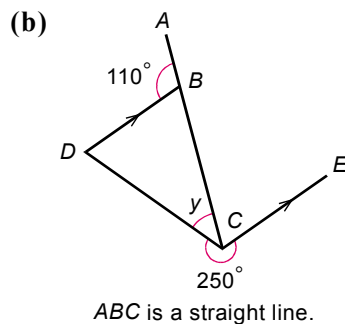
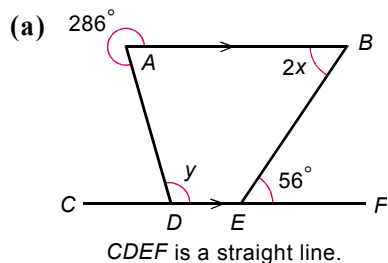
16. Find the unknowns in the following figures.



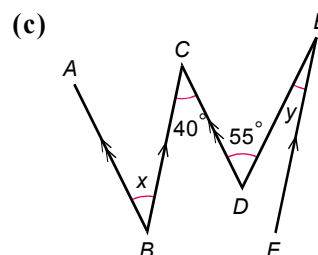
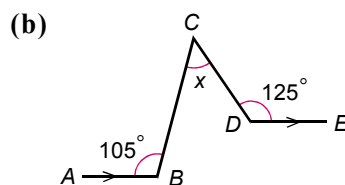
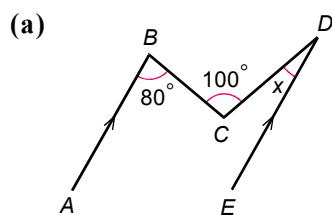


Challenging Question

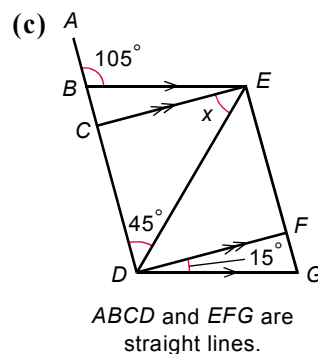
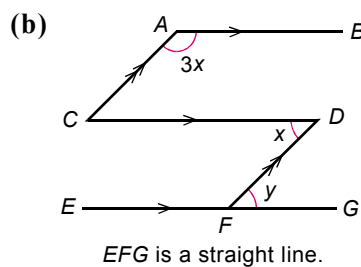
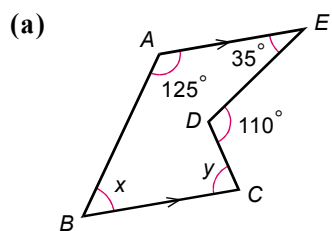
17. Find the unknowns in the following figures.



18. Find the unknowns in the following figures.



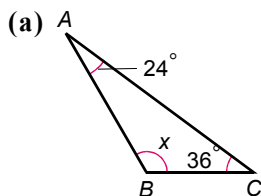
19. Find the unknowns in the following figures.



Build - up Exercise 13C

Fundamental Question

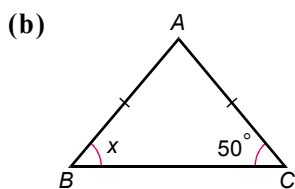
20. Fill in the blanks.



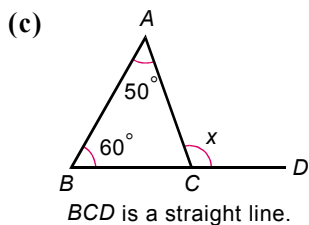
$$x + 24^\circ + 36^\circ = \underline{\hspace{2cm}} \quad (\hspace{1cm})$$

$$x + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}}$$



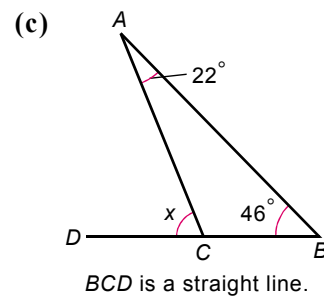
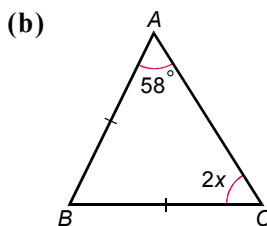
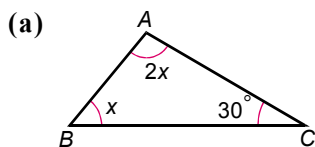
$$x = 50^\circ \quad (\hspace{1cm})$$



$$x = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \quad (\hspace{1cm})$$

$$= \underline{\hspace{2cm}}$$

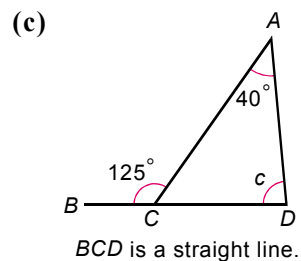
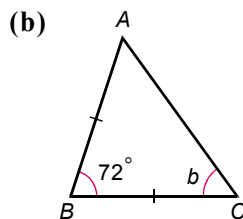
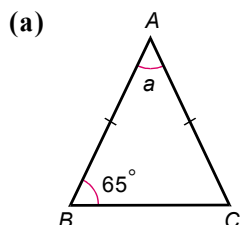
21. Find the unknowns in the following figures.



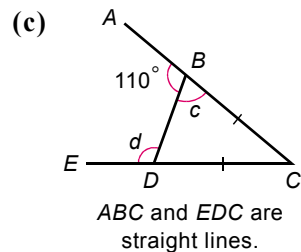
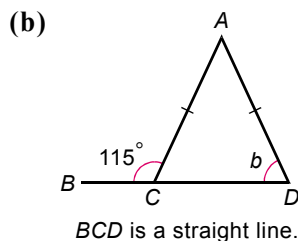
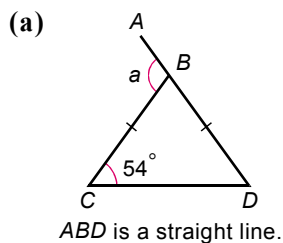


Consolidation Question

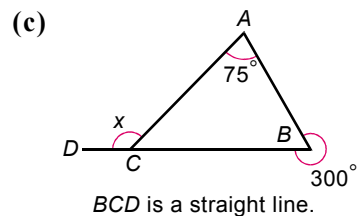
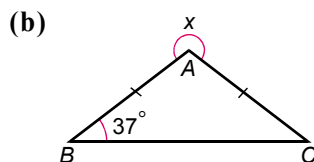
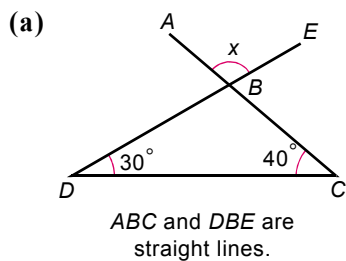
22. Find the unknowns in the following figures.



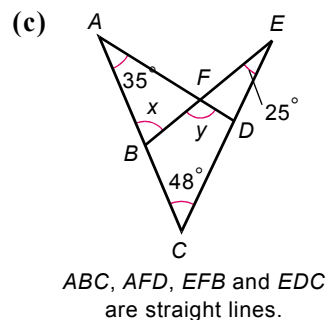
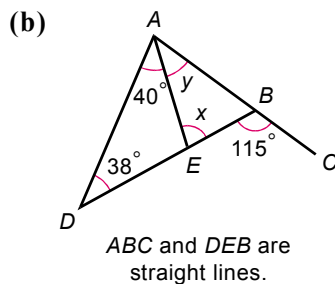
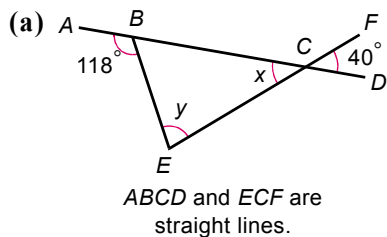
23. Find the unknowns in the following figures.



24. Find the unknowns in the following figures.

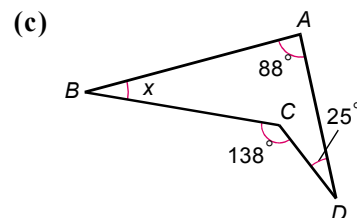
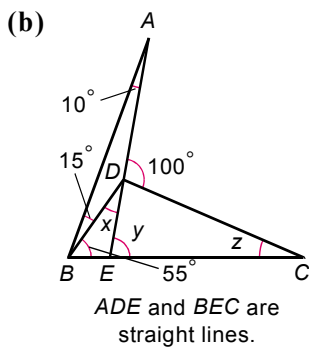
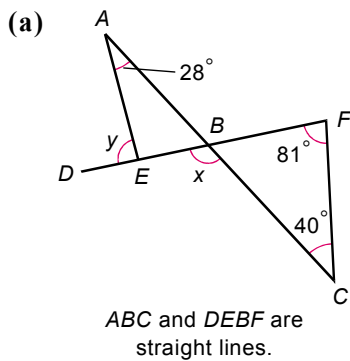


25. Find the unknowns in the following figures.

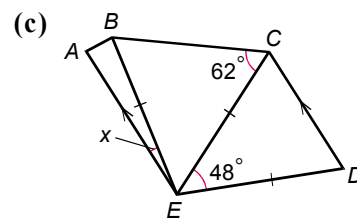
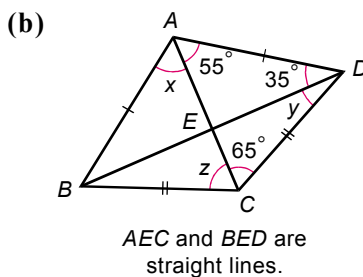
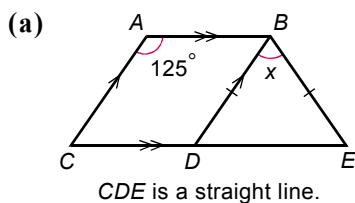




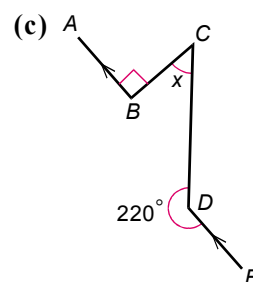
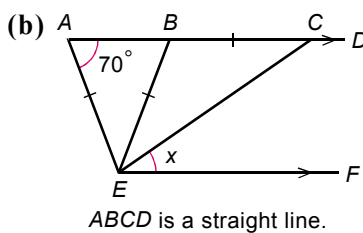
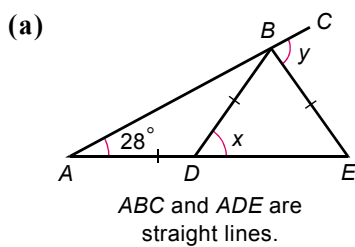
26. Find the unknowns in the following figures.



27. Find the unknowns in the following figures.



28. Find the unknowns in the following figures.

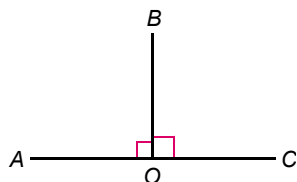


Build - up Exercise 13D



Fundamental Question

29. To prove that AOC in the figure is a straight line, complete the proof by filling in the blank with a suitable theorem.



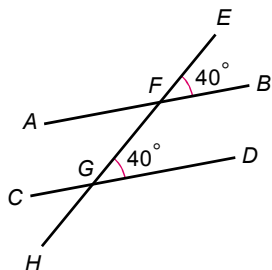
Proof:

$$\begin{aligned} \therefore \angle AOB + \angle BOC \\ &= 90^\circ + 90^\circ \\ &= 180^\circ \end{aligned}$$

$\therefore AOC$ is a straight line. ()

30. In each of the following, AFB , CGD and $EFGH$ are straight lines. Fill in the blanks with suitable theorems.

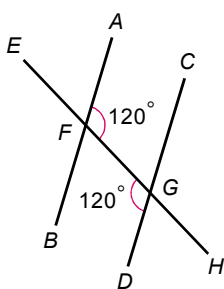
(a)



$$\therefore \angle EFB = \angle EGD$$

$\therefore AB \parallel CD$ ()

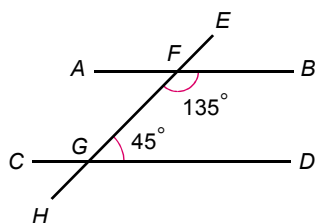
(b)



$$\therefore \angle AFG = \angle DGF$$

$\therefore AB \parallel CD$ ()

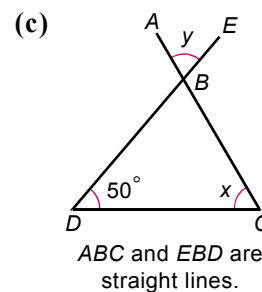
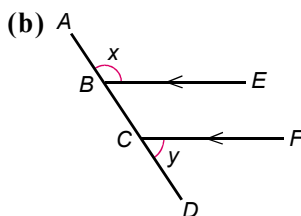
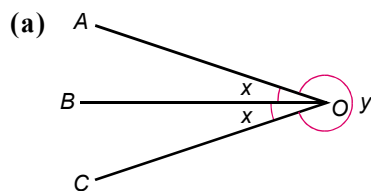
(c)



$$\begin{aligned}\therefore \angle BFG + \angle FGD &= 135^\circ + 45^\circ \\ &= 180^\circ\end{aligned}$$

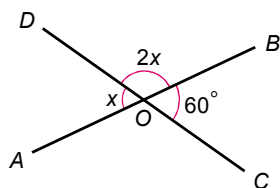
$\therefore AB \parallel CD$ ()

31. In each of the following figures, express y in terms of x .



Consolidation Question

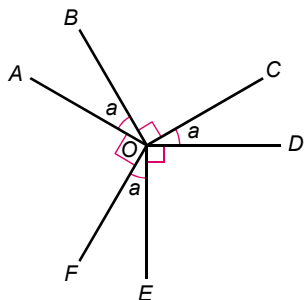
32. In the figure, COD is a straight line.



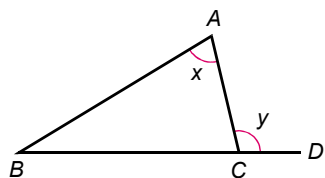
(a) Find x .

(b) Prove that AOB is a straight line.

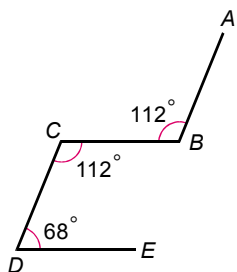
33. In the figure, $\angle AOF$, $\angle EOD$ and $\angle BOC$ are right angles. Prove that a is $\frac{1}{3}$ of a right angle.



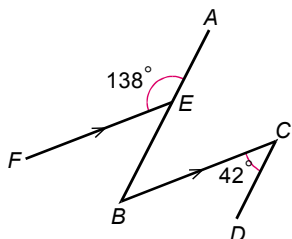
34. In the figure, BCD is a straight line and $AB = BC$. Prove that $x + y = 180^\circ$.



35. In the figure,



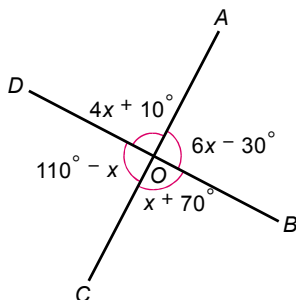
- (a) prove that $AB \parallel CD$.
 (b) prove that $CB \parallel DE$.
36. In the figure, AEB is a straight line, $FE \parallel BC$. Prove that $EB \parallel CD$.



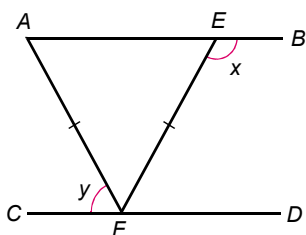


Challenging Question

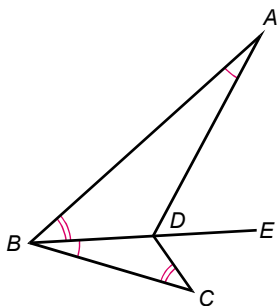
37. (a) Find x in the figure.
 (b) Prove that AOC and BOD are straight lines.
 (c) Prove that $AC \perp BD$.



38. In the figure, E and F are points on AB and CD respectively such that $FA = FE$. If $x + y = 180^\circ$, prove that $AB \parallel CD$.



39. In the figure, BDE is a straight line. $\angle BAD = \angle CBD$ and $\angle ABD = \angle BCD$.



- (a) Prove that $\angle ADE = \angle CDE$.
 (b) Prove that $\angle ADC = 2\angle ABC$.